Mission: Moon Math
Videoconference Event 2: Measurement Uncertainty
Teacher Prep

Prior to this event, students will need to watch Video 2 from the Moon Math Challenge webpage.

Order of Presentation:
1) **Welcome**

2) **Icebreaker:**
   a) Present will ask student teams to provide their project question and list of materials they will need for their project Please ensure students are ready to present this information.
      i) Presenter may follow up by asking the students, "What are you going to measure?"

3) **Lesson – Measurement Uncertainty**
   a) Students will need data sheet (available online and at end of this document), rulers, and pencils. Calculators are optional. Math can be done by hand. Students will also need to work in pairs.
   b) Again, please assist the presenter in selecting students to answer questions if required, since it is sometimes difficult to see individual students through the camera.
   c) Experiment: without any tools, how can you measure the perimeter of your desk/table? Answer: Use the width of your hands, from wrist to finger tip.
   d) Students will be asked to measure the perimeter of their desks/table by using their hands.
      i) Each student should make their own measurement and record data on datasheet.
      ii) Did everyone come up with the same answer? (no)
      iii) Does that mean someone's answer is wrong? (no)
      iv) Why did you get different numbers? (different hand sizes)
   e) Students will be asked to standardize their measurement.
      i) Measure your hand width with the ruler.
      ii) Multiply number of hand-widths with the measurement.
   f) Students will be asked if their answers are all the same. (no)
      i) Why are the answers not all exactly the same?
      ii) All errors become compounded together and result in the variability.
      iii) Does this mean your answer is wrong? (no)
      iv) Aha! Factor: All measurements will have uncertainty and no one can tell whose answer is closest to reality.

4) Upcoming notices
   a) By the next videoconference, each team will need to have started their projects and provide at the videoconference
      i) Experiment Method
      ii) Some data to use in the next lesson
   b) Watch the last video.
   c) Remind students again to complete Brain Teasers and Letter of Intent if not already done so.

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DLN Event 2: Measurement Uncertainty
Data Sheet

Observer Name	Table perimeter (hands)	Hand size (cm)	Table perimeter (cm)
		Average =	

Questions to discuss in your class:

What are the sources of uncertainty in your measurements?
How many significant digits should you use in your final answer?
How does your group's data compare with the rest of the class?
Try graphing your class results and show the variability between results.